



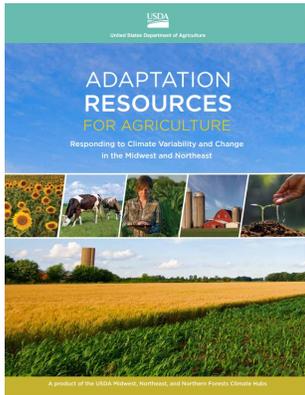
# Southern Plains Climate Hub

U.S. DEPARTMENT OF AGRICULTURE

## Adaptation Resources for Agriculture

### A Case Study: Kettner Farm, Mulshoe, TX

Jodie Reisner, NRCS Liaison to USDA Southern Plains Climate Hub



The [Adaptation Resources for Agriculture Workbook](#) was jointly developed by [USDA Climate Hubs](#) and NRCS to support producers, service providers, and educators to manage climate change. The workbook helps producers consider both short-term adaptive management actions (<5 yrs) and long-range strategic plans (5 to 20 yrs, subject to farm type). This workbook promotes adaptation through multiple resources including a “menu” of adaptation strategies/ approaches and example tactics for cropping and forages, confined livestock, grazing, orchards and small fruit and vegetable production systems. Recent efforts by USDA Climate Hub NRCS Liaisons work to increase the number of examples, and have been documented as Case Studies. These Case Studies are of producers utilizing the **5-step process** in the workbook to document their management choices to ameliorate climate change impacts to their operations.

## Kettner Farm and the Southern High Plains Region of Texas

Kelly and Deborah Kettner operate a diverse farm in the Southern High Plains Region of Texas (Lamb and Parmer Counties). The Southern High Plains is characterized by large areas of open plains on an elevated plateau at 4,600 ft in the northwest, gradually decreasing to 2,600 ft in the southeast. Nearly level, gentle slopes dominate the landscape. Farmland makes up the largest portion of this area. Farms range from 3,000 to 6,000 acres in size and typically have 75% of the acreage irrigated and 25% of the acres dryland farming. Cotton is a major crop because it uses less water and has a profitable economic return.

**1 DEFINE:** The Kettner Farm’s overall goals for the entire operation is to reduce risk, implement soil health management principles, and protect the soil resource for future agricultural production. For irrigated acres, reducing inputs, water conservation, and increased economic returns are a priority. For dryland acres: have diverse crop rotations with cover crops used as forage for the sheep and beef cattle. This will assist in keeping the soil productive for the years when cotton is grown.

**2 ASSESS:** Warmer temperatures, increased potential for drought and intensity of naturally occurring droughts, increase in soil moisture loss, declining Ogallala aquifer levels, and well water recharge issues are expected. Possible impacts to these changes: Not having enough water to sustain cotton production; Extreme heat events causing animal stress as they are introduced into the farm ecosystem; Warmer nights and less water negatively impact corn production; Droughts de-

creasing the ability to have successful cover crop stands; Hail storms, an extreme weather event, can destroy whole regions of crops.



Photo Credit: Jodie Reisner, USDA NRCS

***\*\*Texas is ranked in the top 10 states affected by extreme climatic events. In the 21st century, historically unprecedented warming is projected with increased extreme heat events. Projected changes in precipitation is unknown, but extreme precipitation is expected. Higher temperatures will increase soil moisture loss and increase the intensity of naturally occurring droughts.***

For more information on the Southern Plains Climate Hub, please visit:  
<https://www.climatehubs.oce.usda.gov/hubs/southern-plains>

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**3 EVALUATE:** What management challenges/opportunities may occur as a result of climate change? In the table below, management challenges/opportunities that may occur as a result of climate change are recorded with the feasibility of meeting management objectives under current farm management listed.

Step 3: EVALUATE Management Objectives Given Projected Impacts and Vulnerabilities			
Land Unit	Objective	Challenges to Meeting Objective with Climate Change	Opportunities for Meeting Objective with Climate Change
Entire Farm	Increase microbial activity of soil	Effective weed and fertility management, while still reducing input of synthetic nutrients and chemical treatments	Reduced inputs and increased water use efficiency
Dryland	Cover crops - For Ex.: Cotton harvested in November and the next day Cereal Rye is planted - Management decisions are made for timing of planting and terminating cover crop, and next cash crop to be planted.	Rainfall for seed germination	Grazing opportunities
Irrigated	Rotations with high residue crops and mix in low residue crops (cotton) for plant diversity and use animals to improve soil health and utilize forages from cover crops	Timing of cover crops and water utilization if well water levels decrease Moving animals	Grazing opportunities and reduced inputs of fertilizers and herbicides

**4 IDENTIFY:** The fourth step of the process is brainstorming tactics farmers can implement to enhance a farm’s ability to adapt to climate change and meet management goals. Kettner Farm identified two tactics and approaches: **Tactic 1.** Plant different varieties of commodity crops with diverse harvest dates to widen the window of opportunity to plant cover crops. **Approach:** May change crops and cover crops that can cope with warmer and drier conditions. **Tactic 2.** Reduce inputs and increase yields for economic returns. **Approach:** Keep the soil covered to reduce weed pressure and increase beneficial insects.

**5 MONITOR:** As the climate changes in the Southern High Plains Region of Texas, Kettner Farms will continually monitor their management decisions and how this impacts challenges/ opportunities in production agriculture and farm health. Specifically, they will be evaluating their economics (input and output costs over years), how implementing animals will affect yields, water pumping differences, and differences in utility costs.



Photo Credit: Jodie Reisner, USDA NRCS

## The Take-Away

For farmers in this region, the type of management objectives that Kettner Farm has is visionary, yet possible, if there is a willingness to change the current culture of agriculture in the region. Planting summer cover crops after wheat and incorporating animals are management options that have challenges, but also opportunities for soil health. The [Adaptation Resources for Agriculture Workbook](#) can be a valuable process for any agricultural producer to undertake in helping identify these challenges and opportunities.

### For more information:

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